during the last days of April, and the early days of May, in almost exactly the latitude occupied by the great group during the January appearance, and in almost the same longitude as it occupied in March, whilst an examination of earlier photographs in 1891 has shown two evanescent little groups on September 27 and October 25, in the precise region which was the seat of the first appearance of the group in November last. The entire region, therefore, has been the seat of strong, intermittent, and repeated disturbance.

On a Pretended Early Discovery of a Satellite of Mars.

By Ralph Copeland, Ph.D.

In the Crawford Library of the Edinburgh Royal Observatory is a quarto pamphlet of ten leaves, the complete title of which is: "Eberhard Christian Kindermanns, Königl. Pohl. und Churfürstl. Sächszl. Hof-*Math.* und *Astronomi*, ASTRONOMISCHE BESCHREIBUNG und NACHRICHT von dem COMETEN 1746. Und denen noch kommenden, welche in denen innen besagten Jahren erscheinen werden.—Dreszden, zu finden bey Gottlob Christian Hilschern, Hof-Buchhändler, 1746." Although Kindermann* thus held the post of astronomer to the King of Poland, who was at the same time Electoral-Prince of Saxony, the few observations he has placed on record have hitherto proved of very little value. Doubts, indeed, have at various times been expressed as to their general trustworthiness; nor is it quite certain that the comet of which the little book under consideration professes to treat ever really existed, although Kindermann gives the names of two persons and mentions a third by whom he alleges it to have been seen, as well as by himself. Dr. Hind, however, has succeeded in deriving a rough orbit from the fuller particulars given by Struyck, to whom Kindermann had communicated them. The tract also contains predictions of the return of three several comets, amongst them that of 1661, of which the elements, computed long previously by Halley, resemble those of the comet of 1532. Probably it was this resemblance which led Kindermann to assume their identity with a period of 129 years and a consequent return in 1790, a conjecture which, it is needless to say, was never realised.

These particulars are now of little moment, except in so far as they characterise the writer of the book, the frontispiece of which is sufficiently striking, containing, as it does, a little figure professing to show the orbit of a satellite of *Mars* discovered by the author. The encircling legend runs: "Via Luna (*sic*) Martis entdecket vom Autore den 10. Iul: 1744." On

* The Pulkowa Library contains three of his books, including the one described above.

the face of the planet are various distinct markings, amongst which it is easy to recognise the long "dumb-bell," drawn by Divini and Cassini, and figured in the first volume of the *Philosophical Transactions*. The satellite is only removed about $2\frac{1}{2}$ radii of *Mars* from the centre of the planet. The satellite is nearly four-tenths of the diameter of the primary, and both bodies are liberally provided with atmospheres.

It may be mentioned that *Gulliver's Travels* were given to the world in 1726–7, while Voltaire's *Micromégas* seems to have been published about 1752. The statements they contain about the moons of *Mars* are widely known through Professor Hall's memoir. Kindermann's "discovery" is thus intermediate, in point of date, between the felicitous conceptions of the great satirists.

On the Illumination of Saturn's Rings during Sunrise; and on recent Observations of their Reappearance. By the Rev. A. Freeman.

In order to ascertain the significance of the American and European observations made in 1891 October and November, near the time when the Sun's centre was in the plane of *Saturn's* Rings, I have investigated expressions for the intensity of light cast by the Sun upon the rings, at the four stages when, to an observer at *Saturn's* centre, one-fourth, one-half, three-quarters, and the whole of the Sun's diameter has risen above the plane of the rings. Adopting the method given by Sir J. Herschel in the article on *Light* (*Encyc. Metrop.* § 44 sqq.) or in Parkinson's *Optics*, § 42; if with vertex at the centre of the rings, we draw a cone whose generators touch the spherical surface of the Sun, and consider the boundaries of the section of a hemisphere radius unity, concentric with the rings, intercepted between the cone and the plane of the rings; and if we project this intercepted surface orthogonally upon the plane of the rings, we have an exact representation of the intensity of Sun-light received upon unit area at the centre of the ring-plane. Moreover, if 2θ be the circular measure of the apparent diameter of the Sun as seen from *Saturn*, the intensity thus measured will be of the order θ^3, and will differ in fact from the average intensity of the whole ring by a term of the order $\frac{a^2}{\rho^2}\theta^4$, in which $\frac{a}{\rho}$ is the circular measure of the radius of the ring as seen from the Sun, *i.e.*, the circular measure of about $20''{\cdot}2$, and θ is the circular measure of about $102''{\cdot}3$. This small term may evidently be neglected. The surface of the rings is not truly plane, but an increase of brightness of any element of the surface will be balanced by a corresponding decrease on an opposite element, and so the average illumination of the whole surface will not be affected by the deviation from a plane.